

CONVERGENCE

Through Silicon Integration

Paul Otellini

**President &
Chief Operating Officer
Intel Corporation**





Paul Otellini

President and
Chief Operating Officer

The 3rd Era of Computing



Personal Computers



Converged Devices



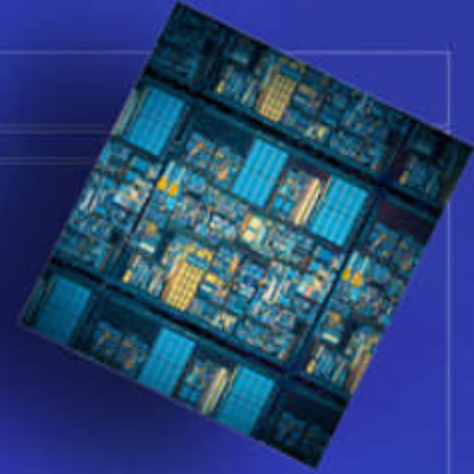
Mainframes



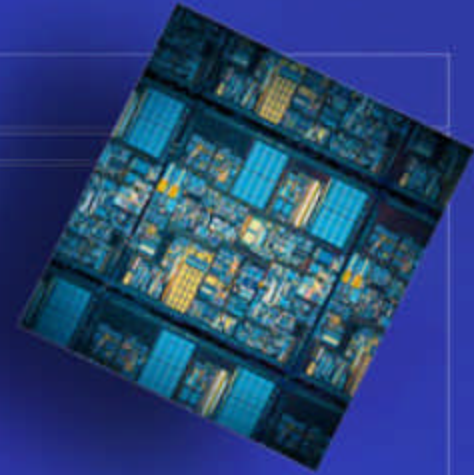
ULTIMATE GOAL

Bringing Computing to Everyone,
Anytime, Anyplace in the world

Why Now?



Why Now?



Computing is becoming more pervasive

Cheaper available intelligence

The microprocessor has become ubiquitous

And not just in the PC

Servers, Handhelds, Cell Phones, Network Processors,
Modular Communications Infrastructure...

Why Intel?



Why Intel?

integrated electronics



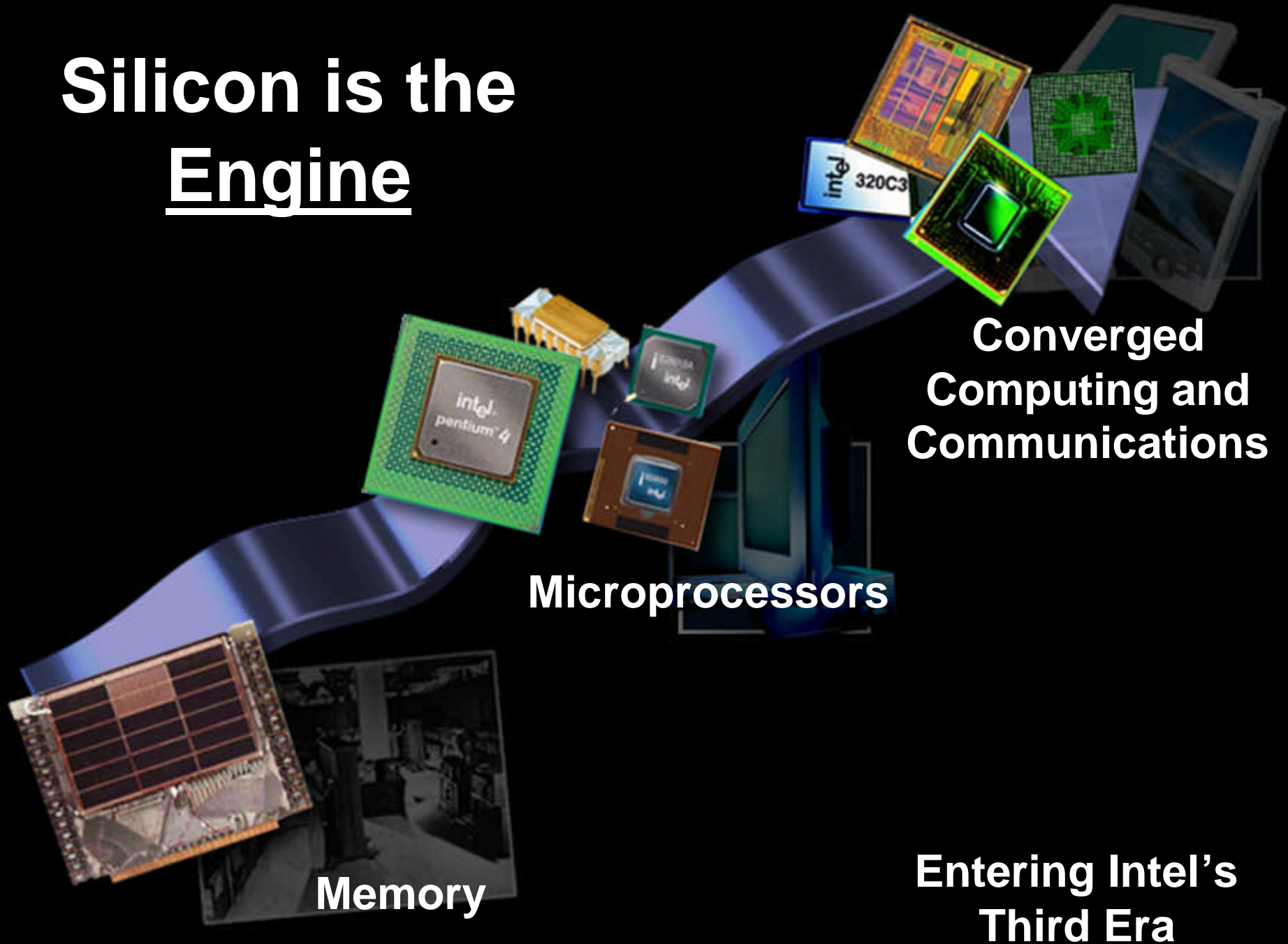


Intel, the microprocessor company, but...

Tailoring computers to users needs

And... the world's leader in communications Si

Silicon is the Engine



**Converged
Computing and
Communications**

Microprocessors

Memory

**Entering Intel's
Third Era**

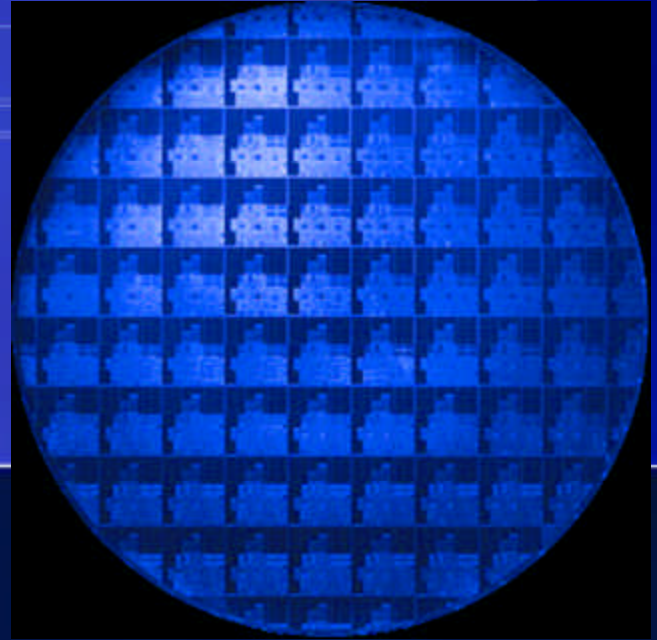
A man in a white shirt and glasses is looking down at a small, dark, rectangular device he is holding in his hands. The background is a blurred image of a modern building with glass windows. A blue overlay covers the left side of the image, featuring faint white circuit patterns. Two white rectangular boxes with black borders contain text.

All computers will
communicate...

All communications
devices will compute...

Convergence:

Communications and Computing



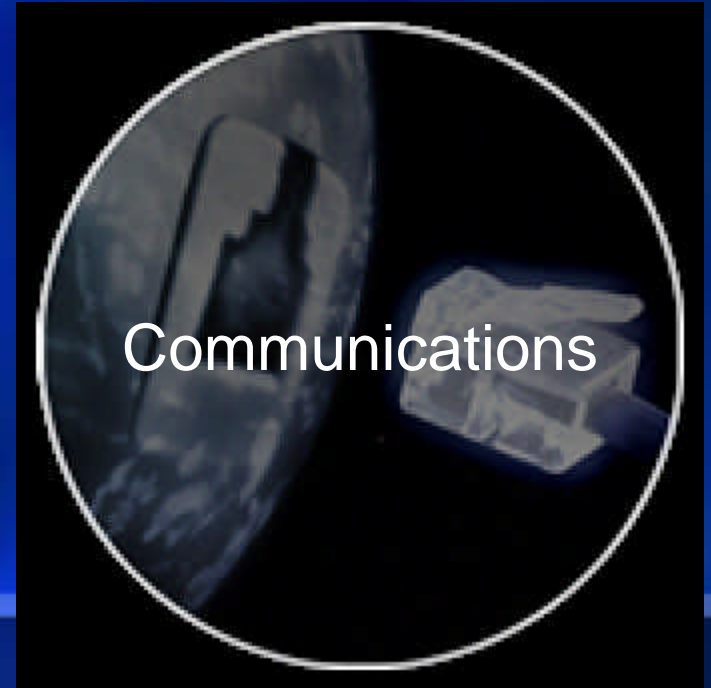
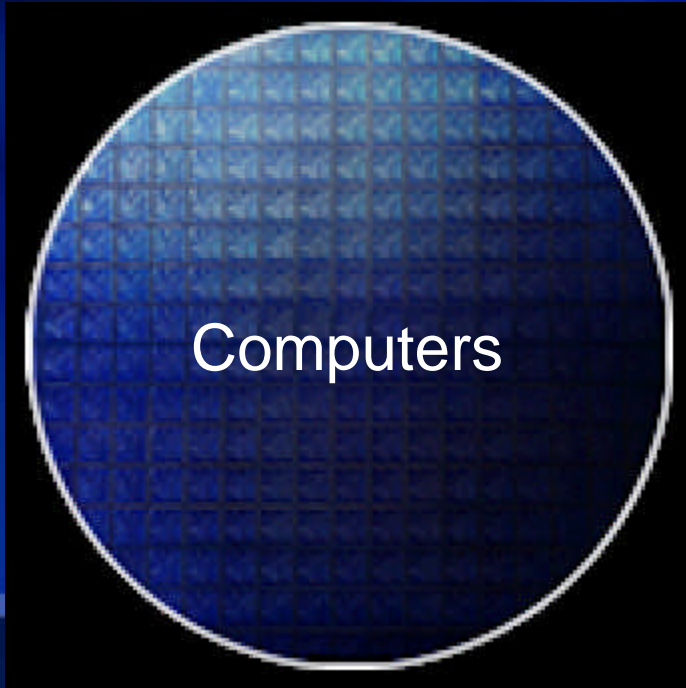
A photograph of two women in a call center environment. They are both wearing headsets and looking at a laptop. The woman on the left is wearing a black jacket over a blue top, and the woman on the right is wearing a denim jacket. The background shows office cubicles. The image is darkened to serve as a background for the text.

Intel's Mission:

Drive Convergence through
Integration

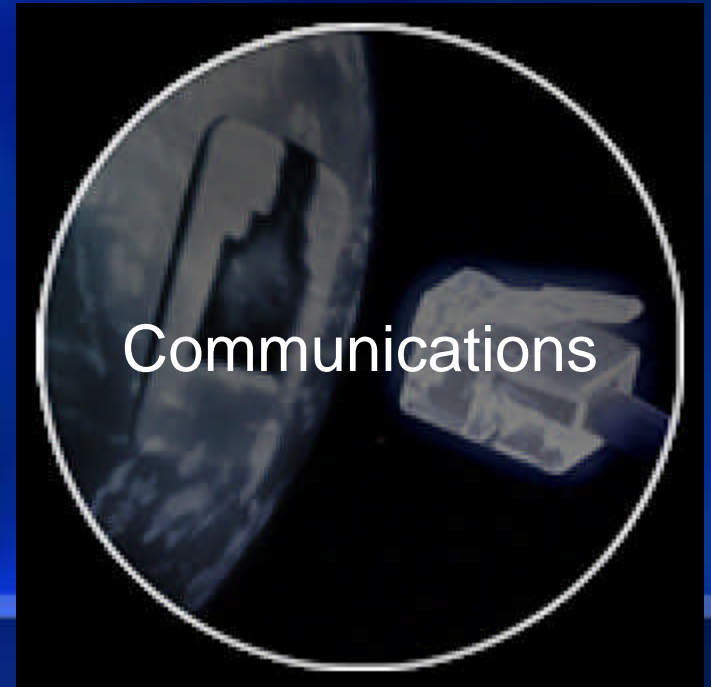
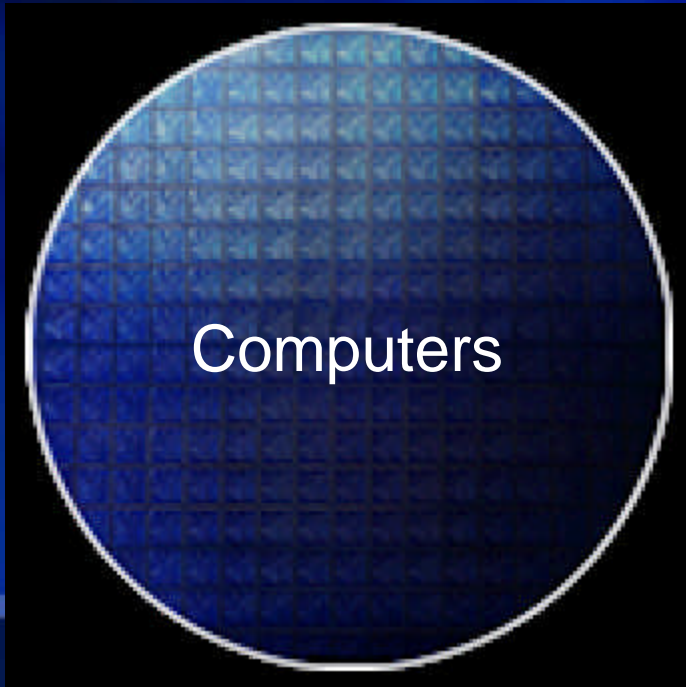
Phase 1: The Dream...

Early Local Area Networks, Ethernet...



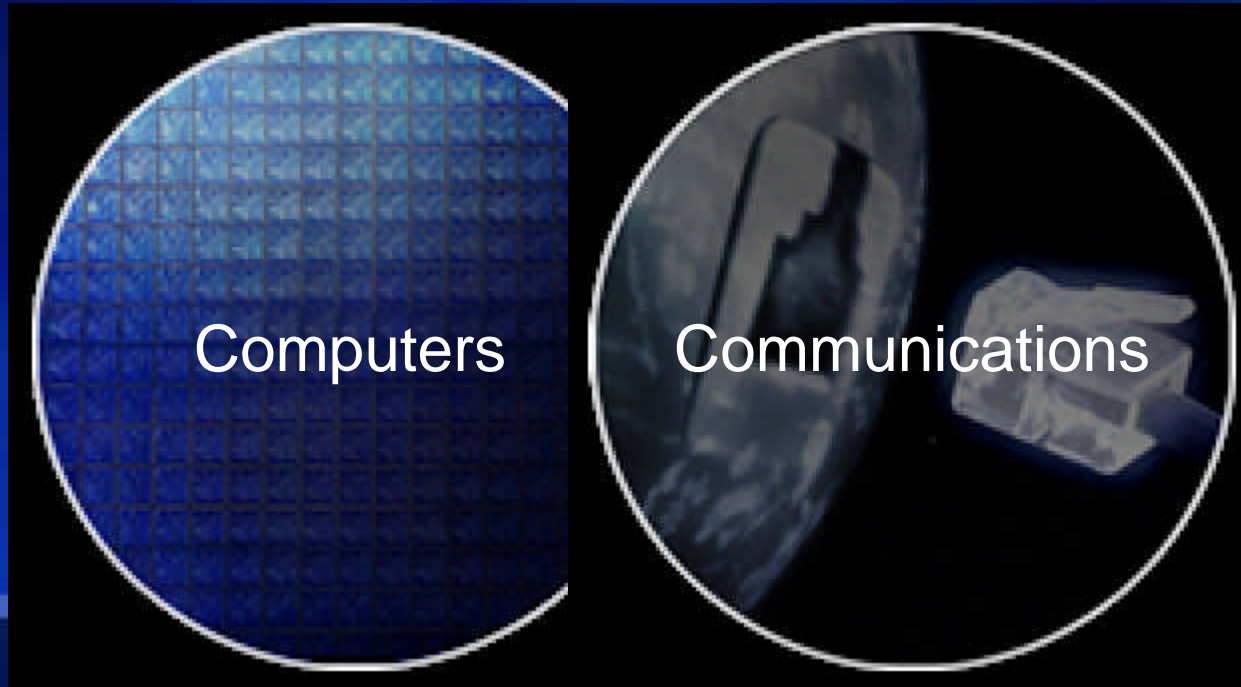
Phase 2: Today

Internet, Moving to Broadband, Digital Content



Phase 3: Tomorrow

Anytime/Anywhere/Any Device



Our Role:

Deliver “converged” Si and platforms
Provide “convergence” tools



Our Goal:

Write once, run best on Intel processors

The Early Days...

Apps targeted for one specific platform - No cross requirements...

Since the 1980's...

Client / Server computing introduced: OSF, Win32 API's, Posix...

Today: The Challenge

Proliferation of devices, operating systems, usage models

Data and application inter-operability; "occasionally connected"

Entering the third era, with extended, converged devices
The common denominator is **Intel** Silicon...

Example: Macromedia



Anytime/Anywhere usages
driving need for commonality

Our Role: Drive Convergence

Today:

today

IPP Libraries,
Compilers, VTune
PCA, IA-32, IPF

Next Year:

2003

integrated SDK's:

"IA-32 / PCA"

"IXA / IA-32"

Plus threading tools...

**Software
College**

Our Role: Drive Convergence

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Your Role:

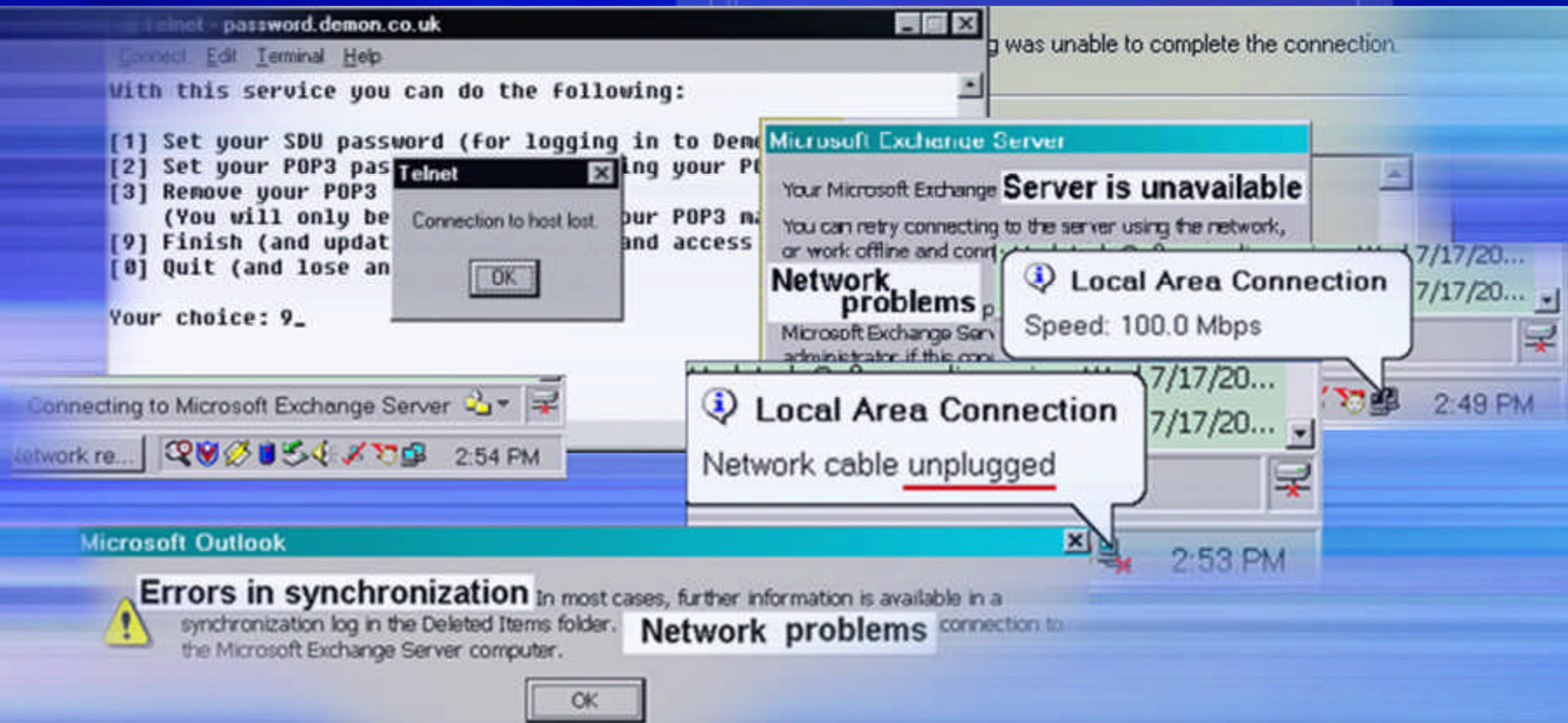
Create:

Device-aware apps
Mobile-aware apps

2003 and beyond

Disconnections vs Connections...

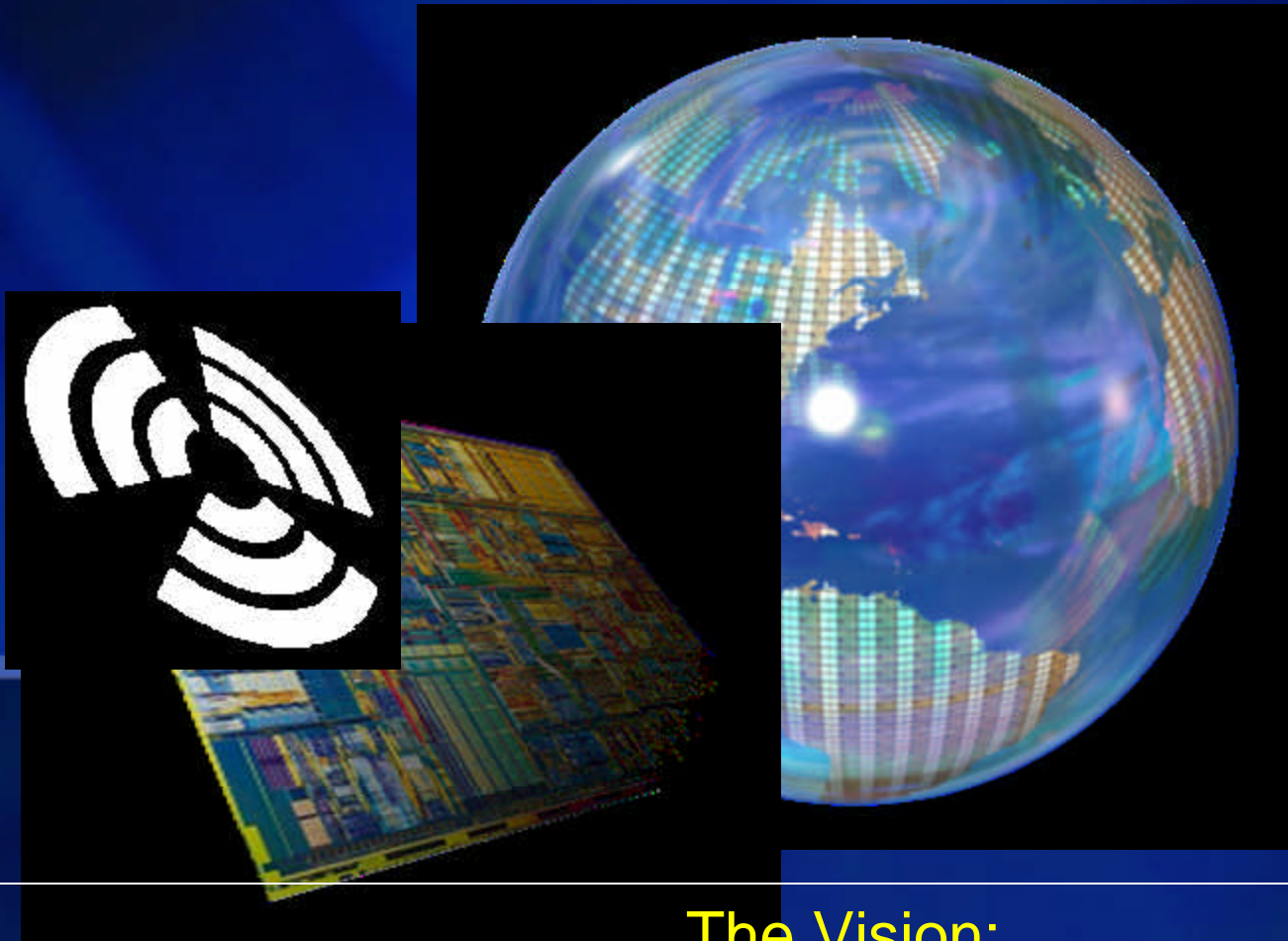
will drive us to embrace web services



...develop for mobility

Phase 4: Chip Level Integration

The opportunity: A 1 Billion transistor template



PAN
Bluetooth, UWB

LAN
802.11 a,b,g,h...

WAN
2.5G, 3G, ...

The Vision:

Self detecting, auto configuring connectivity for everyone, everywhere

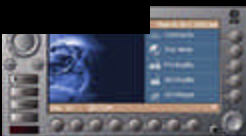




Servers



Devices

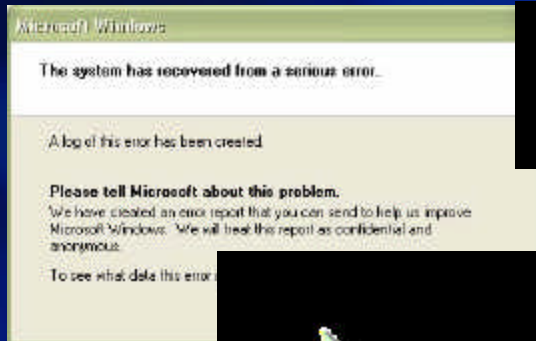


Clients



Closing The Feedback Loop

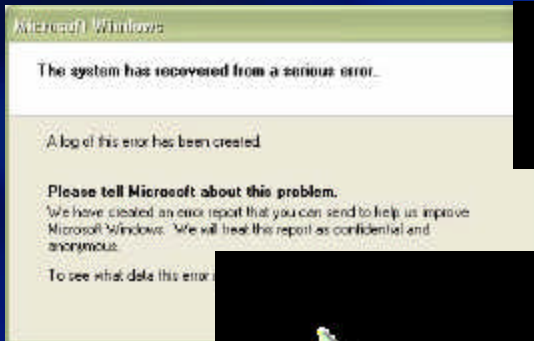
Customer sends error



**Windows Error
Reporting Site**

Closing The Feedback Loop

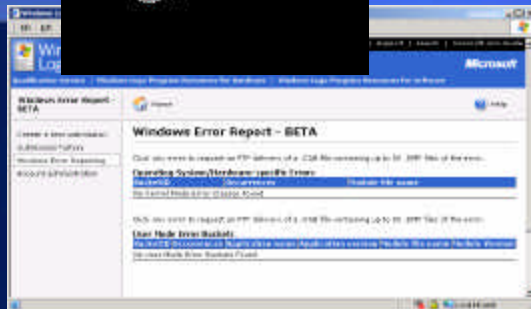
Customer sends error



Data replicated
as viewed on
submission



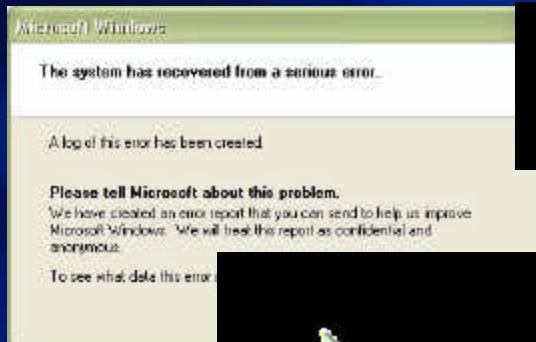
Windows Error
Reporting Site



Vendor logs in and checks
Windows Error Report

Closing The Feedback Loop

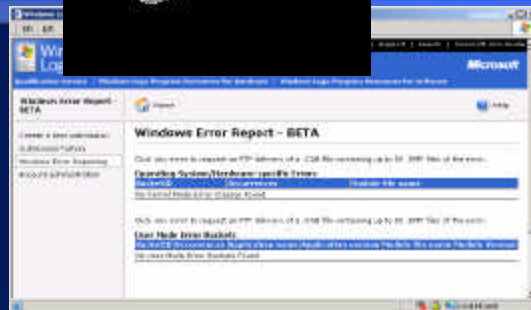
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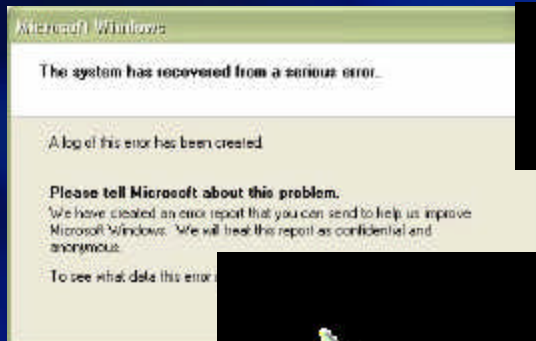
Vendor logs in and checks
Windows Error Report



Vendor fixes bugs
Passes HCT tools

Closing The Feedback Loop

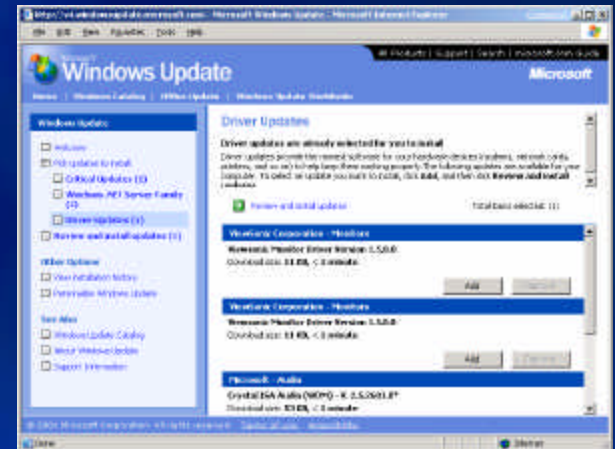
Customer sends error



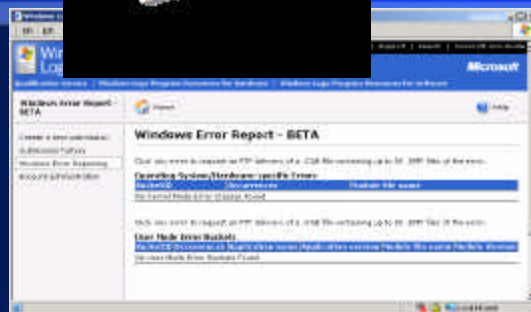
Data replicated
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submission



Windows Error
Reporting Site



Vendor logs fixed driver
on Window Update



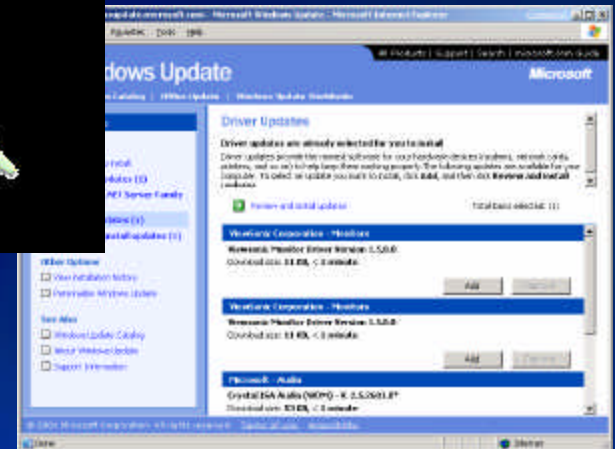
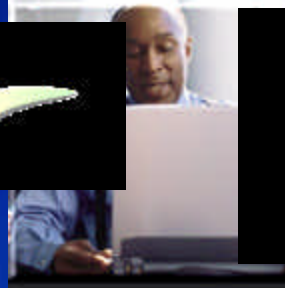
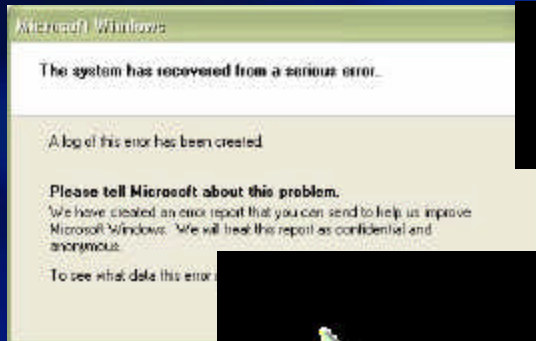
Vendor logs in and checks
Windows Error Report



Vendor fixes bugs
Passes HCT tools

Closing The Feedback Loop

Customer's PC works



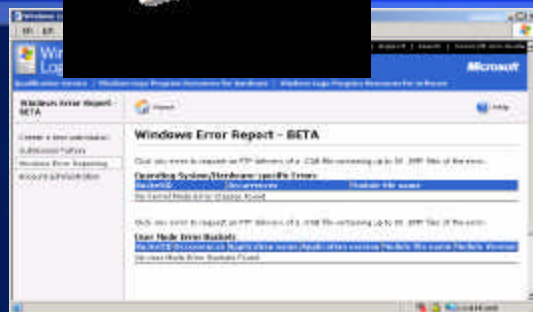
Data replicated
as viewed at
submission



Windows Error
Reporting Site



Vendor logs in and checks
driver logs in Window Update

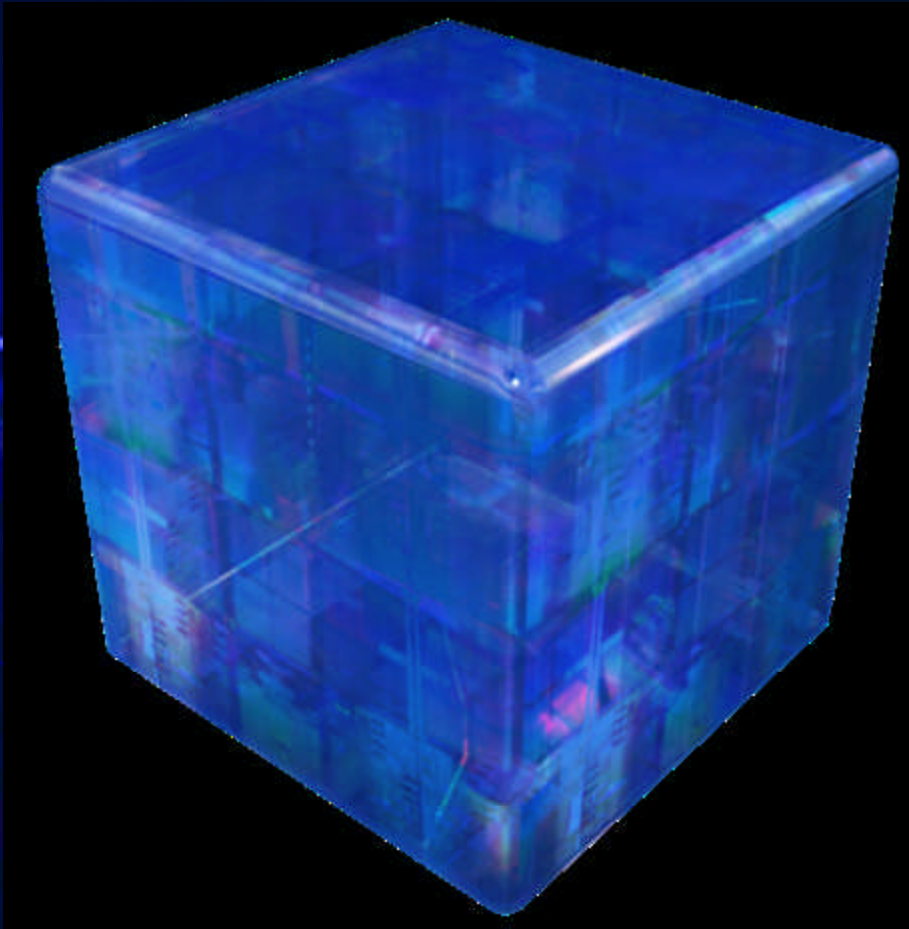


Vendor logs in and checks
Windows Error Report



Vendor fixes bugs
Passes HCT tools

Intel is Driving the Platform





"Moore" Performance

Demo

"More" Performance

"Moore" Performance

Hyper-Threading

Driving Innovation

Hyper-Threading Technology

1st demonstrated at fall '01 IDF



Driving Innovation

Hyper-Threading Technology



1st demonstrated at fall '01 IDF

In production for servers in Q1'02

Delivering up to 30% performance in threaded environments

Driving Innovation

Hyper-Threading Technology



1st demonstrated at fall '01 IDF

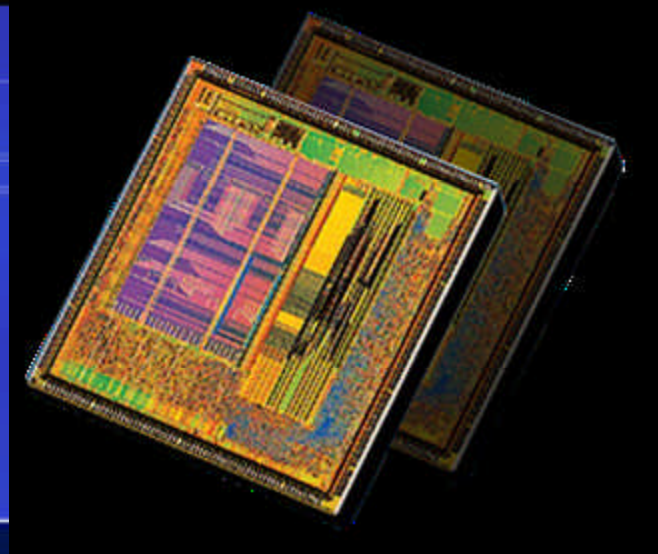
In production for servers in Q1'02

Delivering up to 30% performance in threaded environments

Announcing: HT to the desktop with 3GHz in 2002

Delivering up to 25% performance increase for mainstream consumer and business applications

Real performance for servers and desktops in '02



Hyper-Threading

Making Threading Happen



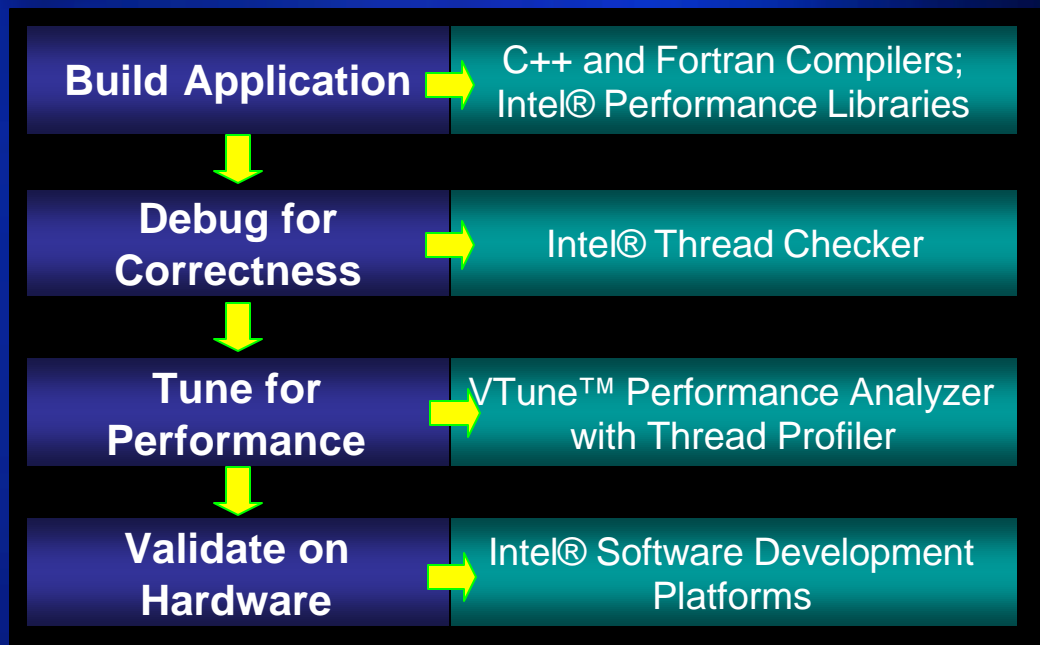
Hyper-Threading in 2003:

(% of all Intel based units)

Performance Desktop: >25%

Workstations: >60%

Servers: >80%



**Intel® Developer Services
Early Access Program**

Developers: *Take advantage of “free” performance*

Drive multi-threading into the mainstream:
apps, tools, services, drivers, and platforms

Safer Computing

"More" Performance

▶ "Moore" Performance

Introducing: LaGrande Technology

Intel LaGrande Technology

....Creating a Safer Computing Environment



- Convergence requires a more secure environment
 - HW based strengthening is critical
- Intel's LaGrande Technology will deliver a foundation
 - Protected execution, protected memory, protected storage
 - Delivered through processor and chipset extensions
- Intel is working with the industry to enable & deploy
 - Engagements with privacy experts, leading OEMs, ISVs, and OSVs
 - Expect to bring to market with broad Ecosystem over next 2-3 years

Animation

Platform Enhancements

Safer Computing

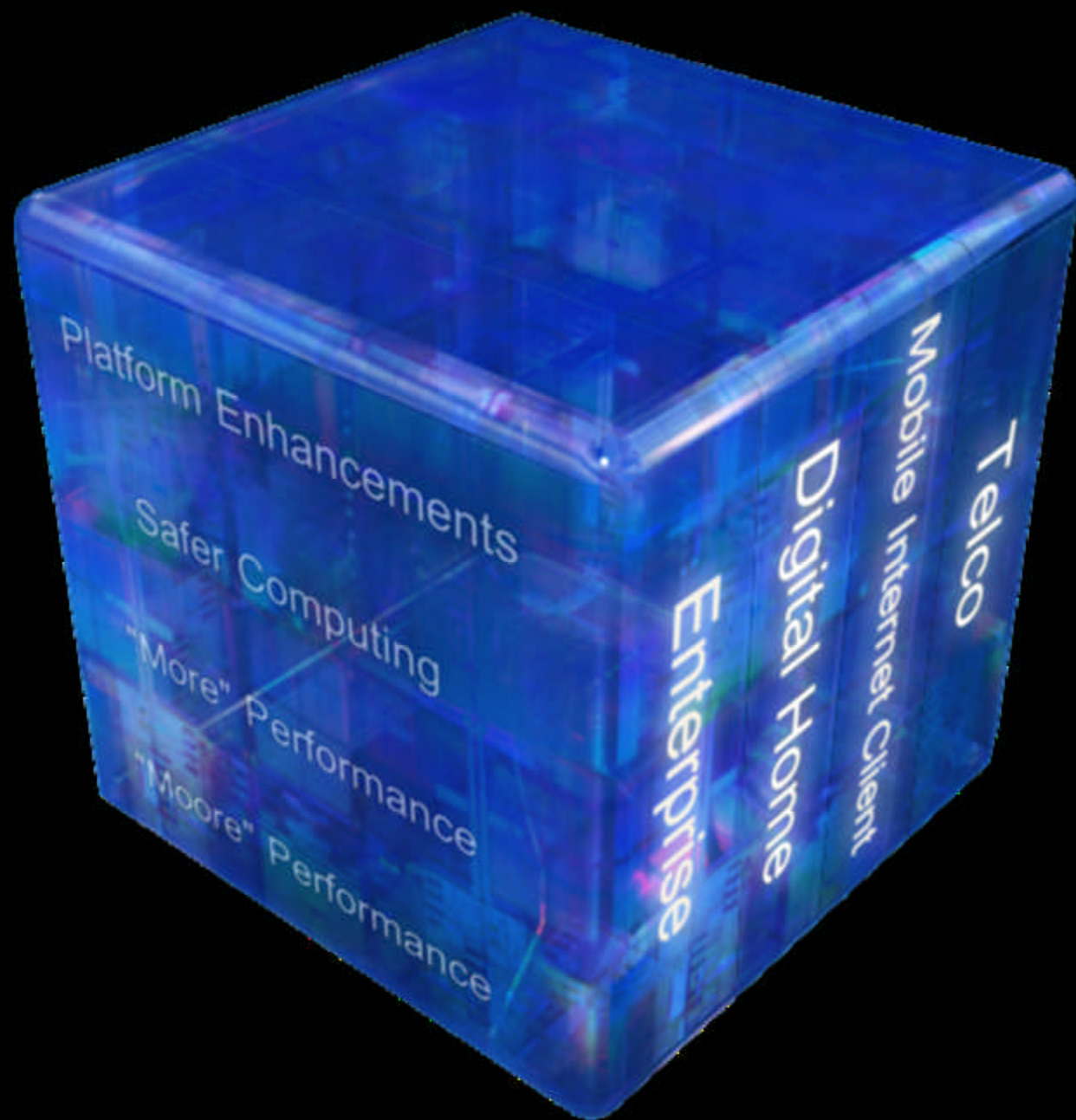
"More" Performance

"Moore" Performance

Next Generation I/O, Tools, Compilers, Drivers



Demo







Convergence Engine